

Claims

I claim:

1. A method of manufacturing comprising the steps of:
preparing a powder metal mixture;
5 putting the powder metal mixture into a die;
compressing the powder metal mixture to form a part;
removing the part from the die;
sintering the part by application of heat;
spinning the part with a rotating mandrel;
10 engaging the part with a roller while spinning the part;
and
flow forming the part with the roller.
2. The method as in claim 1 wherein flow forming the part
15 comprises flow forming a multiple ribbed surface in the part.
3. The method as in claim 1 further comprising the step of
flow forming an inside diameter surface of the part.
- 20 4. A part comprising:
a powder metal body having a density;
an outer portion of the body having a density greater than
the body density by spinning.
- 25 5. The part as in claim 4, wherein the outer portion further
comprises a multiple ribbed profile.
6. The part as in claim 4 further comprising an inner portion
of the body having a density greater than the body density by
30 spinning.
7. The part as in claim 4 wherein the density of the outer
portion of the body is approximately 8 to 15% greater than a
density of the body.

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8. The part as in claim 6 wherein the density of the inner portion of the body is approximately 8 to 15% greater than a density of the body.
- 5 9. The part as in claim 5, wherein a grain structure portion is substantially parallel to a rib surface.
10. A part comprising:
a powder metal body having a density;
10 an outer portion of the body having a density greater than the body density solely by application of pressure to the outer portion.
11. The part as in claim 10, wherein the outer portion further
15 comprises a multiple ribbed profile.
12. The part as in claim 10 further comprising an inner portion of the body having a density greater than the body density solely by application of pressure to the outer
20 portion.
13. The part as in claim 10 wherein the density of the outer portion of the body is approximately 5 to 10% greater than a density of the body.
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14. The part as in claim 12 wherein the density of the inner portion of the body is approximately 8 to 15% greater than a density of the body.
- 30 15. The part as in claim 11, wherein a grain structure portion is substantially parallel to a rib surface.
16. A part comprising:
a powder metal body having a body density;

a body portion having a density greater than the body density solely by application of pressure to the body portion.

5 17. The part as in claim 16, wherein the body portion further comprises a multiple ribbed profile.

10 18. The part as in claim 16 further comprising a second body portion having a density greater than the body density solely by application of pressure to the second body portion.

19. The part as in claim 16 wherein the density of the body portion is approximately 5 to 10% greater than a body density.

15 20. The part as in claim 18 wherein the density of the second body portion is approximately 8 to 15% greater than a body density.

20 21. The part as in claim 17, wherein a body portion grain structure orientation is substantially parallel to a rib surface.